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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/667,714

09/22/2003

Christian L. Belady

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HEWLETT PACKARD COMPANY

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INTELLECTUAL PROPERTY ADMINISTRATION

FORT COLLINS, CO 80527-2400

EXAMINER

CARPIO, IVAN HERNAN

ART UNIT

PAPER NUMBER

2841

DATE MAILED: 01/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/667,714

Applicant(s)

BELADY, CHRISTIAN L.

Examiner

Ivan H. Carpio

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) 1-20 and 29-33 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 21-28 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Response to Arguments

Examiner acknowledges the election with traverse filed by the applicant, but does not find the arguments persuasive. The applicants first argument is that the product and process restriction is improper because the product claims contain the limitation that the liquid is received into the sealed electronics module, the Examiner respectfully disagrees. Claims 1 and 15 state that there is liquid communication between the sealed electronics module and the liquid cooling module, liquid communication can occur from the outside, the liquid cools the module housing and thus the air inside, communicating by liquid means with the liquid cooling module. Claim 21 states that there is means arranged within the sealed electronics module for dissipating heat, again this means can be the air inside interacting with the module housing that is cooled by the liquid. The applicant's second argument is that the combination subcombination restriction regarding group III is improper because the limitation upon which the restriction relies is in dependant claim 5 and not in independent claim 1, the Examiner respectfully disagrees. The restriction was made as a group and not as individual claims, it is proper procedure to restrict groups from each other even if the limitation is in the dependant claim. The applicants third argument that the combination subcombination restriction regarding group IV is improper because how the heat is dissipated from the liquid cooling module is irrelevant, the Examiner respectfully disagrees. One needs to demonstrate that the combination does not require the particulars of the subcombination, since the manner in which the heat is dissipated is a particular of the

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subcombination demonstrating that this particular is not necessary is sufficient to render the restriction proper. The applicant's fourth argument that the subcombinations useable together restriction is improper because separate utility was not shown properly in regards to the use of the liquid cooling module on a remote control car, the examiner respectfully disagrees. Claims 3 states that the liquid cooling module is connected to a electronics module which is configured to be used in a computer system, since a remote control car is not a computer system and the liquid cooling module can be used to cool the internal components of the remote control car, separate utility is shown. Furthermore since all the groups are in different classification and require different searches the restriction is proper and hereby made Final.

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 21-28, drawn to a liquid cooled modular electronic system, classified in class 361, subclass 699.
- II. Claims 29-32, drawn to a method for cooling an electronic module, classified in class 29, subclass 830+.
- III. Claims 1-14, drawn to an electronic system, classified in class 174, subclass 252.
- IV. Claims 15-20 and 33, drawn to a liquid cooling module apparatus, classified in class 165, subclass 80.4.

The inventions are distinct, each from the other because of the following reasons:

Inventions I, III, IV and II are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case the cooling liquid need not be received into the sealed electronics module instead it can be wrapped around the electronic module housing and dissipate heat away from the housing thus cooling the air inside the module housing and cooling the electronic components.

Inventions I and III, IV are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because (regarding group III) the modules need not be sealed against noise, airborne contaminants, nuclear, biological and chemical agents for functionality, and (regarding group IV) the heat can be dissipated from the liquid cooling module in a variety of different ways such as through metal conduction and not through conditioned air or conditioned liquid. The subcombination has separate utility such as operating individually cooling individual electronic systems without the need for connections to a second liquid cooled modules or the need for redundant systems.

Inventions III and IV are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention IV has separate utility such as cooling electronic systems that are non-computer systems such as cooling the components of a remote control car or audio speaker. See MPEP § 806.05(d).

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and the search required for any individual group (I, II, III, IV) is not required for any other group (I, II, III, IV) restriction for examination purposes as indicated is proper.

Applicant elects to prosecute invention I, claims 21-28.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 21-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Rumbut (US Patent 5740018).

With respect to claim 21 Rumbut teaches a liquid cooled modular electronics system (Fig. 2), comprising: one or more sealed electronics modules (Fig. 1, element 100, and Fig. 2), a sealed electronics module including: one or more electronics components arranged within the sealed electronics module (Fig. 1, element 150 Note: components not shown but are inherent on circuit boards); one or more connectors (Fig. 1, elements 109,118) attached to the sealed electronics module, the connectors configured to provide one or more detachable connections between the sealed electronics module and liquid transporting means (Fig. 2, elements 209 as 224) for providing liquid communication between the sealed electronics module and one or more external liquid cooling modules (Fig. 2, element 250); and means (Fig. 1, element 103) arranged within the sealed electronics module for dissipating heat generated by one or more of the one or more electronics components using liquid that is transported between the sealed electronics module and the external liquid cooling module; and one or more liquid cooling modules, a liquid cooling module including: one or more connectors (Fig. 2, the ends of elements 212 and 218) attached to the liquid cooling module, the connectors configured to provide one or more detachable connections between the liquid cooling module and the liquid transporting means; means arranged within the liquid cooling module for receiving a liquid to be cooled; means (column 4, lines 13-31) arranged within the liquid cooling module for cooling the liquid to be cooled into a cooled liquid; means (Fig. 1, element 103) arranged within the liquid cooling module for providing the cooled liquid to one or more sealed electronics modules via the liquid transporting means; and means (column 3, lines 45-

55) arranged within the liquid cooling module for dissipating heat transferred to the liquid cooling module from the liquid to be cooled; where the one or more liquid cooling modules and the one or more sealed electronics modules are separate modules that can be selectively connected together by the one or more detachable connections to establish liquid communication therebetween.

With respect to claim 22 and with all the limitations of claim 21, Rumbut teaches that one or more sealed electronics modules are configured to be dynamically operably connected (Fig. 2, note that two or more electronic modules are connected by elements 209 and 212) by a detachable connection to one or more second liquid cooled electronics modules.

With respect to claim 23 and with all the limitations of claim 21, Rumbut teaches that the one or more sealed electronics modules are sealed with respect to electromagnetic interference (Claim 4).

With respect to claim 25 and with all the limitations of claim 21, Rumbut teaches that the one or more sealed electronics modules are configured to be in liquid communication (Fig. 2, liquid communication occurs through liquid transporting means) with one or more second sealed electronics modules via the one or more detachable connections.

With respect to claim 27 and with all the limitations of claim 21, Rumbut teaches a rack (Fig.2, element 200) configured to mount the one or more sealed electronics modules and the liquid cooling module.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 24 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rumbut.

With respect to claim 24 and with all the limitations of claim 21, Rumbut teaches all of the limitations except that the one or more electronic components include one or more of, a microprocessor, memory chip, controller chip and a power subsystem component. It is well known in the art to have microprocessors, memory chips, controller chips and/or power subsystem components on circuit boards for the purpose of accomplishing specific functions. For example many circuit boards have processors and memory chips, such as motherboards, for the purpose of processing, analyzing and manipulating data and then storing the resultant data for later usage. It would have been obvious to one of ordinary skill in the art at the time of the invention to have processors and memory chips on the circuit boards of the liquid cooling system, taught by Rumbut, for the purpose of processing and storing data while maintaining proper operating temperature.

With respect to claim 28 and with all the limitations of claim 21, Rumbut teaches all of the limitations except that the liquid cooling modules are configured in a redundant fail-over system. Redundancy is a very well known and used method in many systems, for example in electrical systems redundancy is used for power supply units to assure

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that if one power unit goes down another kicks in, it is also used in cooling systems when one fan fails another starts etc. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a redundant fail-over system with the liquid cooling modules, taught by Rumbut, so that if one liquid cooling module fails another cooling module starts working thus protecting the temperature sensitive components on the circuit board.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Quernemoen (US patent 6453169) in view of Rumbut.

With respect to claim 26 Quernemoen teaches all of the limitations including an electronics system being a scaleable M processor server (Fig. 1, element 22 and column 6, second paragraph) but does not teach the liquid cooling system comprising a sealed electronics module; one or more electronics components arranged within the sealed electronics module; one or more connectors attached to the sealed electronics module, the connectors configured to provide one or more detachable connections to liquid transporting apparatus, the liquid transporting apparatus configured to provide liquid communication between the sealed electronics module and an external liquid cooling module; and a cooling apparatus arranged within the sealed electronics module that cools the one or more electronics components using liquid that is transported between the sealed electronics module and the external liquid cooling module. Rumbut teaches a liquid cooling system comprising, comprising: one or more sealed electronics modules (Fig. 1, element 100, and Fig. 2), a sealed electronics module including: one or more electronics components arranged within the sealed

electronics module (Fig. 1, element 150 Note: components not shown but are inherent on circuit boards); one or more connectors (Fig. 1, elements 109,118) attached to the sealed electronics module, the connectors configured to provide one or more detachable connections between the sealed electronics module and liquid transporting means (Fig. 2, elements 209 as 224) for providing liquid communication between the sealed electronics module and one or more external liquid cooling modules (Fig. 2, element 250); and means (Fig. 1, element 103) arranged within the sealed electronics module for dissipating heat generated by one or more of the one or more electronics components using liquid that is transported between the sealed electronics module and the external liquid cooling module; and one or more liquid cooling modules, a liquid cooling module including: one or more connectors (Fig. 2, the ends of elements 212 and 218) attached to the liquid cooling module, the connectors configured to provide one or more detachable connections between the liquid cooling module and the liquid transporting means; means arranged within the liquid cooling module for receiving a liquid to be cooled; means (column 4, lines 13-31) arranged within the liquid cooling module for cooling the liquid to be cooled into a cooled liquid; means (Fig. 1, element 103) arranged within the liquid cooling module for providing the cooled liquid to one or more sealed electronics modules via the liquid transporting means; and means (column 3, lines 45-55) arranged within the liquid cooling module for dissipating heat transferred to the liquid cooling module from the liquid to be cooled; where the one or more liquid cooling modules and the one or more sealed electronics modules are

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separate modules that can be selectively connected together by the one or more detachable connections to establish liquid communication therebetween.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the liquid cooled modular electronic system, taught by Rumbut, with the scaleable M processor server, taught by Quernemoen, for the purpose of maintaining proper component temperature while at the same time allowing for easy assembly and disassembly of the liquid cooling system furthermore the liquid cooled modular electronic system allows for replacing components and circuit boards with out the need to replace or alter the cooling system.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent 5675473 discloses a liquid cooled modular system with connectors.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ivan H. Carpio whose telephone number is 571-272-8396. The examiner can normally be reached on M-R 6:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kammie Cuneo can be reached on 571-272-1957. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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